ATTACHMENT F

TABLES 3.3 AND 3.4 REFERENCE TABLE FORMATS

Sample Reference Table - Surficial Soil

Soil lab data will be used to determine the Representative Concentration of each constituent at the site.
All soil contamination concentrations will be stated in units of mg/kg (ppm).

SURFICIAL SOIL REFERENCE TABLE
for Resident (Adult & Child) and Commercial Worker Receptors (0-1')

Boring # & Depth of Sample	Date Collected	Chemicals of Concern							
		Benzene	Toluene	Ethyl-benzene	Xylenes	1,2 DCA	MtBE	Naph-thalene	EDB
SB-1 (0-1')	10/17/02	8	20	65	240	ND	ND	ND	ND
SB-2 (0-1')	10/17/02	5	40	35	110	ND	ND	12	ND
SB-3 (0-1')	10/17/02	ND	ND	ND	ND	ND	ND	ND	ND
SB-4 (0-1')	10/17/02	0.75	20	19	200	ND	ND	ND	ND
SB-5 (0-1')	10/17/02	ND	ND	ND	ND	ND	ND	ND	ND
Highest concentration per constituent		8	40	65	240	ND	ND	12	ND
25% of highest concentration		2	10	16.3	60	NA	NA	3	NA
Total of conc. which are >25% of max. concentration		13	80	119	550	ND	ND	12	ND
Number of values used		2	3	3	3	-	-	1	-
Representative Concentration		**6.5**	**26.7**	**39.7**	**183.3**	**ND**	**ND**	**12**	**ND**

SURFICIAL SOIL REFERENCE TABLE for Construction Worker Receptor (0-10')

Boring # & Depth of Sample	Date Collected	Chemicals of Concern							
		Benzene	Toluene	Ethyl-benzene	Xylenes	1,2 DCA	MtBE	Naph-thalene	EDB
SB-1 (0-1')	10/17/02	8	20	65	240	ND	ND	ND	ND
SB-1 (5-10')	10/17/02	0.1	30	80	325	ND	ND	ND	ND
SB-2 (0-1')	10/17/02	5	40	35	110	ND	ND	12	ND
SB-2 (5-10')	10/17/02	0.06	60	60	155	ND	ND	28	ND
SB-3 (0-1')	10/17/02	ND	ND	ND	ND	ND	ND	ND	ND
SB-3 (5-10')	10/17/02	ND	ND	20	326	ND	ND	30	ND
SB-4 (0-1')	10/17/02	0.75	20	19	200	ND	ND	ND	ND
SB-4 (5-10)	10/17/02	0.09	12	11	140	ND	ND	25	ND
SB-5 (0-1')	10/17/02	ND	ND	ND	ND	ND	ND	ND	ND
SB-5 (5-10')	10/17/02	ND	ND	ND	ND	ND	ND	ND	ND
Highest concentration per constituent		8	60	80	326	ND	ND	30	ND
25% of highest concentration		2	15	20	81.5	NA	NA	7.5	NA
Total of conc. which are >25% of max. concentration		13	170	260	1496	ND	ND	95	ND
Number of values used		2	5	5	7	-	-	4	-
Representative Concentration		**6.5**	**34**	**52**	**213.7**	**ND**	**ND**	**23.8**	**ND**

Highlight or designate the values used in calculating the Representative Concentrations.
Representative Concentration will be calculated using the values per constituent equal to or greater than the 25% value.
These Reference Tables are used to define the Rep. Concentration of Surficial Soils used in Tables 3.3A-D & 3.4A-D.
ND = Lab Results indicate "ND"
NA = Not Applicable to this table

Sample Reference Table - Subsurface Soil

Soil lab data will be used to determine the Representative Concentration of each constituent at the site.
All soil contamination concentrations will be stated in units of mg/kg (ppm).

SUBSURFACE SOIL REFERENCE TABLE

Boring # & Depth of Sample	Date Collected	Chemicals of Concern							
		Benzene	Toluene	Ethyl-benzene	Xylenes	1,2 DCA	MtBE	Naph-thalene	EDB
SB-1 (5-10')	10/17/02	0.1	30	80	325	ND	ND	ND	ND
SB-2 (5-10')	10/17/02	0.06	60	60	155	ND	ND	28	ND
SB-3 (5-10')	10/17/02	ND	ND	20	326	ND	ND	30	ND
SB-4 (5-10)	10/17/02	0.09	12	11	140	ND	ND	25	ND
SB-5 (5-10')	10/17/02	ND	ND	ND	ND	ND	ND	ND	ND
Highest concentration per constituent		0.1	60	80	326	ND	ND	30	ND
25% of highest concentration		0.025	15	20	81.5	NA	NA	7.5	NA
Total of conc. which are >25% of max. concentration		0.25	90	160	946	ND	ND	83	ND
Number of values used		3	2	3	4	-	-	3	-
Representative Concentration		**0.083**	**45**	**53.3**	**236.5**	**ND**	**ND**	**27.7**	**ND**

Highlight or designate the values used in calculating the Representative Concentration.
Representative Concentration will be calculated using the values per constituent equal to or greater than the 25% value.
This Reference Table is used to define the Rep. Concentration of Subsurface Soils used in Table 3.3E and 3.4E.
At this site the swl is at 12 feet, therefore, no soil samples were collected at or below that level.
ND = Lab Results indicate "ND"
NA = Not Applicable to this table

Sample Reference Table - Soil Leaching to Groundwater

All soil contamination concentrations will be stated in units of mg/kg (ppm).

"SOIL AT SOURCE" Reference Table

Boring # & Depth of Sample	Date Collected	Chemicals of Concern							
		Benzene	Toluene	Ethyl-benzene	Xylenes	1,2 DCA	MtBE	Naph-thalene	EDB
SB-1 (0-1')	10/17/02	8	20	65	240	ND	ND	ND	ND
SB-1 (5-10')	10/17/02	0.1	30	80	325	ND	ND	ND	ND
SB-2 (0-1')	10/17/02	5	40	35	110	ND	ND	12	ND
SB-2 (5-10')	10/17/02	0.06	60	60	155	ND	ND	28	ND
SB-3 (0-1')	10/17/02	ND	ND	ND	ND	ND	ND	ND	ND
SB-3 (5-10')	10/17/02	ND	ND	20	326	ND	ND	30	ND
SB-4 (0-1')	10/17/02	0.75	20	19	200	ND	ND	ND	ND
SB-4 (5-10)	10/17/02	0.09	12	11	140	ND	ND	25	ND
SB-5 (0-1')	10/17/02	ND	ND	ND	ND	ND	ND	ND	ND
SB-5 (5-10')	10/17/02	ND	ND	ND	ND	ND	ND	ND	ND
Highest concentration per constituent		8	60	80	326	ND	ND	30	ND
25% of highest concentration		2	15	20	81.5	NA	NA	7.5	NA
Total of conc. which are >25% of max. concentration		13	170	260	1496	ND	ND	95	ND
Number of values used		2	5	5	7	-	-	4	-
Representative Concentration		**6.5**	**34**	**52**	**213.7**	**ND**	**ND**	**23.8**	**ND**

This Reference Table is used to define the Rep. Concentration of Soil at Source used in Table 3.3G and 3.4G.
Contamination detected in the soils will be used to determine the Rep. Conc. of Soil at Source, irregardless of depth.
Representative Concentration will be calculated using the values per constituent equal to or greater than the 25% value.

Reference Table for Groundwater Representative Concentrations

All groundwater contamination concentrations will be stated in units of ug/l = ppb.

Data collected within the most recent 24 months from the KRBCA sampling date will be used to calculate the representative concentration. Values not used in calculating rep. conc. have been struck-out.

Highlighted values are greater than the 25% of the highest concentration per constituent per well, and are used to calculate the representative concentrations.

Monitoring Well #	Date Sampled	Chemicals of Concern (values stated in ppb)							
		Benzene	Toluene	Ethylbenzene	Xylenes	1,2 DCA	MtBE	Naphthalene	EDB
MW-1	08-10-01	~~330~~	~~680~~	~~5610~~	~~8800~~	~~ND~~	~~ND~~	~~172~~	~~ND~~
	11-12-01	276	630	5050	8536	ND	ND	36	ND
	02-09-02	400	490	3876	7856	ND	ND	45	ND
	05-15-02	68	255	330	680	ND	ND	15	ND
	08-08-02	374	415	2800	5544	ND	ND	22	ND
	11-10-02	326	351	1264	2965	ND	ND	12	ND
	02-12-03	282	300	652	2837	ND	ND	12	ND
	05-09-03	200	182	387	1625	ND	ND	ND	ND
	10-21-03	180	110	380	1432	ND	ND	ND	ND
Highest concentration per constituent		400	630	5050	8536	ND	ND	45	ND
25% of highest conc.		100	157.5	1262.5	2134	NA	NA	11.25	NA
Total of conc. which are >25% of max. conc.		2038	2623	12990	27738	ND	ND	142	ND
Number of values used		7	7	4	5	-	-	6	-
Representative Conc.		**291.1**	**374.7**	**3247.5**	**5547.6**	**ND**	**ND**	**23.7**	**ND**
MW-2	08-10-01	~~40~~	~~104~~	~~45~~	~~1560~~	~~ND~~	~~ND~~	~~ND~~	~~ND~~
	11-12-01	25	72	182	197	ND	ND	ND	ND
	02-09-02	6	13	453	149	ND	ND	ND	ND
	05-15-02	ND	20	62	ND	ND	ND	ND	ND
	08-08-02	ND	28	35	68	ND	ND	ND	ND
	11-10-02	ND	16	17	32	ND	ND	ND	ND
	02-12-03	ND	12	6	ND	ND	ND	ND	ND
	05-09-03	ND	3	ND	ND	ND	ND	ND	ND
	10-21-03	ND	ND	ND	ND	ND	ND	ND	ND
Highest concentration per constituent		25	72	453	197	ND	ND	ND	ND
25% of highest conc.		6.25	18	113.25	49.25	NA	NA	NA	NA
Total of conc. which are >25% of max. conc.		25	120	635	414	ND	ND	ND	ND
Number of values used		1	3	2	3	-	-	-	-
Representative Conc.		**25**	**40**	**317.5**	**138**	**ND**	**ND**	**ND**	**ND**

continued...

Monitoring Well #	Date Sampled	Chemicals of Concern (values stated in ppb)							
		Benzene	**Toluene**	**Ethylbenzene**	**Xylenes**	**1,2 DCA**	**MtBE**	**Naphthalene**	**EDB**
MW-3	08-10-01	~~ND~~	~~ND~~	~~ND~~	~~20~~	~~ND~~	~~ND~~	~~ND~~	~~ND~~
	11-12-01	ND	ND	ND	ND	ND	ND	ND	ND
	02-09-02	ND	ND	ND	ND	ND	ND	ND	ND
	05-15-02	ND	ND	ND	ND	ND	ND	ND	ND
	08-08-02	ND	ND	ND	ND	ND	ND	ND	ND
	11-10-02	ND	ND	ND	ND	ND	ND	ND	ND
	02-12-03	ND	ND	ND	ND	ND	ND	ND	ND
	05-09-03	ND	ND	ND	ND	ND	ND	ND	ND
	10-21-03	ND	ND	ND	ND	ND	ND	ND	ND
Highest concentration per constituent		ND	ND	ND	ND	ND	ND	ND	ND
25% of highest conc.		NA	NA	NA	NA	NA	NA	NA	NA
Total of conc. which are >25% of max. conc.		ND	ND	ND	ND	ND	ND	ND	ND
Number of values used		-	-	-	-	-	-	-	-
Representative Conc.		**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
MW-4	08-10-01	~~20~~	~~35~~	~~197~~	~~483~~	~~ND~~	~~ND~~	~~87~~	~~ND~~
	11-12-01	18	20	66	358	ND	ND	12	ND
	02-09-02	10	18	58	306	ND	ND	ND	ND
	05-15-02	5	10	27	187	ND	ND	10	ND
	08-08-02	3	ND	39	210	ND	ND	ND	ND
	11-10-02	ND	ND	12	165	ND	ND	ND	ND
	02-12-03	ND	ND	12	89	ND	ND	ND	ND
	05-09-03	ND	ND	ND	79	ND	ND	ND	ND
	10-21-03	ND	ND	ND	55	ND	ND	ND	ND
Highest concentration per constituent		18	20	66	358	ND	ND	12	ND
25% of highest conc.		4.5	5	16.5	89.5	NA	NA	3	NA
Total of conc. which are >25% of max. conc.		33	48	190	1226	ND	ND	22	ND
Number of values used		3	3	4	5	-	-	2	-
Representative Conc.		**11**	**16**	**47.5**	**245.2**	**ND**	**ND**	**11**	**ND**

NOTE: In this example, the analyses from only 4 monitoring wells are demonstrated for the sake of space! In actual reports, all data from all wells should be presented in this Reference Table.

Scenario for this site:

* The site is currently an active gas station.
* MW-1 is located 4 feet from the north side of the commercial building on-site.
* MW-3 is located 2 feet from the south side of the same commercial building.
* No other wells are located near the commercial building.
* Groundwater flow is to the South.

Evaluation of indoor air inhalation pathway via groundwater:

1) Determine the representative concentration of groundwater contamination beneath the on-site commercial building by calculating an average of the representative concentrations for each constituent from MW-1 and MW-3:

	On-Site Representative Concentrations of Chemicals of Concern							
MW #	**Benzene**	**Toluene**	**Ethylbenzene**	**Xylenes**	**1,2 DCA**	**MtBE**	**Naphthalene**	**EDB**
MW-1	291	375	3248	5548	ND	ND	24	ND
MW-3	ND	ND	ND	ND	ND	ND	ND	ND
Average	**146**	**188**	**1624**	**2774**	**ND**	**ND**	**12**	**ND**

(Note: In this table, "ND" values = zero for calculation purposes.)
The "Average" is used as the Representative Concentration value in Tables 3.3F and 3.4F.
If the calculated "Average" does not adequately represent site specific conditions, proceed to the next step.

2) Use your "Best Professional Judgement" by presenting a value which adequately characterizes the contamination level of each constituent beneath the building. Provide your values and reasons for presenting these values. This judgement should be based on lithology, groundwater flow direction, stability of plume, mapped isocontours, and other site specific conditions (excavations, etc.).

3) Repeat the necessary steps for off-site conditions and provide justification as needed.

The Kansas Risk-Based Corrective Action process:

KDHE expects the consultant to use, initially, the highest contaminant concentrations to determine the Representative Concentrations. It is KDHE's intent to provide the most conservative 'risk assessment' for each site. In the event the selected Representative Concentrations exceed Tier 3B RBSL's, then the consultant should use their "Best Professional Judgement" to determine a reasonable Representative Concentration, if applicable. Each site has its own idiosyncrasies and each characteristic should be scrutinized during the KRBCA process.